

A Level Biology A
H420/02 Biological Diversity

Question Set 16

1

The Lake District is the largest National Park in England, covering an area of 2362 km².

It contains a wide variety of species, some of which are under threat or endangered. The resident human population is 41 000. In 2016 the Lake District received 18.4 million tourists.

The proportion of Lake District land used for different purposes is shown in Fig. 18.

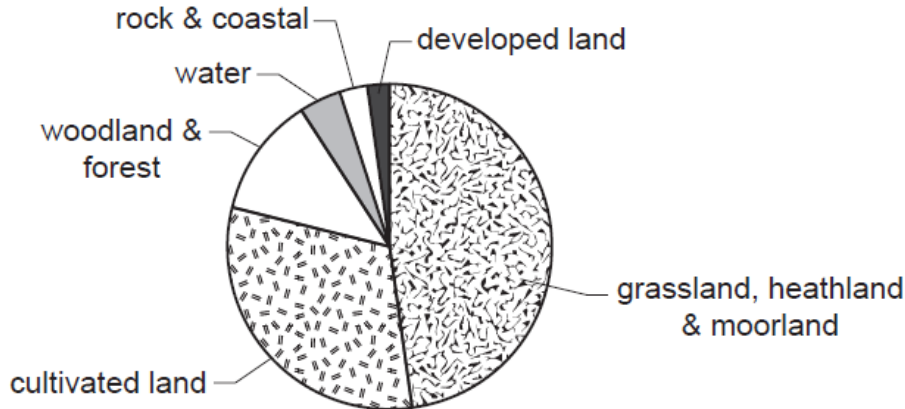


Fig. 18

- (a) Explain **one** way in which tourists can lead to an increase in the biodiversity of an area. **Increase funding for conservation groups. Funding allows them to restore ecosystems and increase habitat and species biodiversity.** [2]
- (b) The Lake District contains large areas where timber is produced. One of the aims of the management of National Parks is to produce timber sustainably.

- (i) Using Fig. 18, **estimate** the percentage of land that is covered by woodland and forest.

$\approx \frac{1}{8} \times 100$ estimate = **12.5** % [1]

- (ii) Timber can be produced economically by a technique called clear felling. Clear felling can damage biodiversity.

Explain how it is possible to produce timber sustainably using clear felling. **By allowing time for new trees to fully grow before next felling or by limiting the size of area that is felled.** [2]

- (iii) A traditional timber-production process that is still used in parts of the Lake District is coppicing.

Describe the process of coppicing **and** explain the potential benefits of coppicing to the biodiversity of a woodland.

Coppicing is cutting deciduous trees close to the ground level to encourage growth of new shoots from cut surface. Then young shoots are protected from grazers and the shoots are left to regrow. Later cut the newly grown shoots and repeat this cycle indefinitely. (rotational coppicing) [6]

Benefits of coppicing:

- New stems would grow more rapidly**
- lifespan of trees is extended**
- It provides variety of habitats**
- Fewer large trees means more light for smaller plants**

- (c) Many schools visit the Lake District to undertake Biology fieldwork.

A group of students investigated the biodiversity of five herb plants they found in adjacent coppiced and mature areas of woodland in the spring of 2016.

Their results are shown in Table 18.

Species	Number of individuals (n)		n/N	$(n/N)^2$
	Coppiced	Mature		
Bluebell	35	46	0.5	0.25
Dog's mercury	2	12	0.0286	8.163×10^{-4}
Foxglove	5	1	0.0714	5.102×10^{-3}
Herb robert	20	4	0.286	0.0816
Wood sorrel	8	4	0.114	0.0131
Total	70	67		$\Sigma = 0.35$

Table 18

- (i) The students calculated the Simpson's Index of Diversity (D) for the mature area to be 0.489.

Use the information in Table 18 to work out the Simpson's Index of Diversity (D) for the area of coppiced woodland.

$$D = 1 - \left(\sum \left(\frac{n}{N} \right)^2 \right)$$

Use the formula:

$$D = 1 - 0.35 = 0.649$$

$$D = \dots 0.649 \dots \quad [3]$$

- (ii) Use the example of the students' fieldwork to explain how biodiversity can be considered at different levels.

There are two different types of habitat (coppiced and mature). This is low habitat biodiversity. The Simpson's Index value for both areas indicate biodiversity is moderate. Thus the species richness is also moderate. But the species evenness is low because there is a huge difference in the number of each species. (E.g. Bluebell and Herb robert are dominant in coppiced area)

Total Marks for Question Set 16: 17

OCR

Oxford Cambridge and RSA

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact The OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge